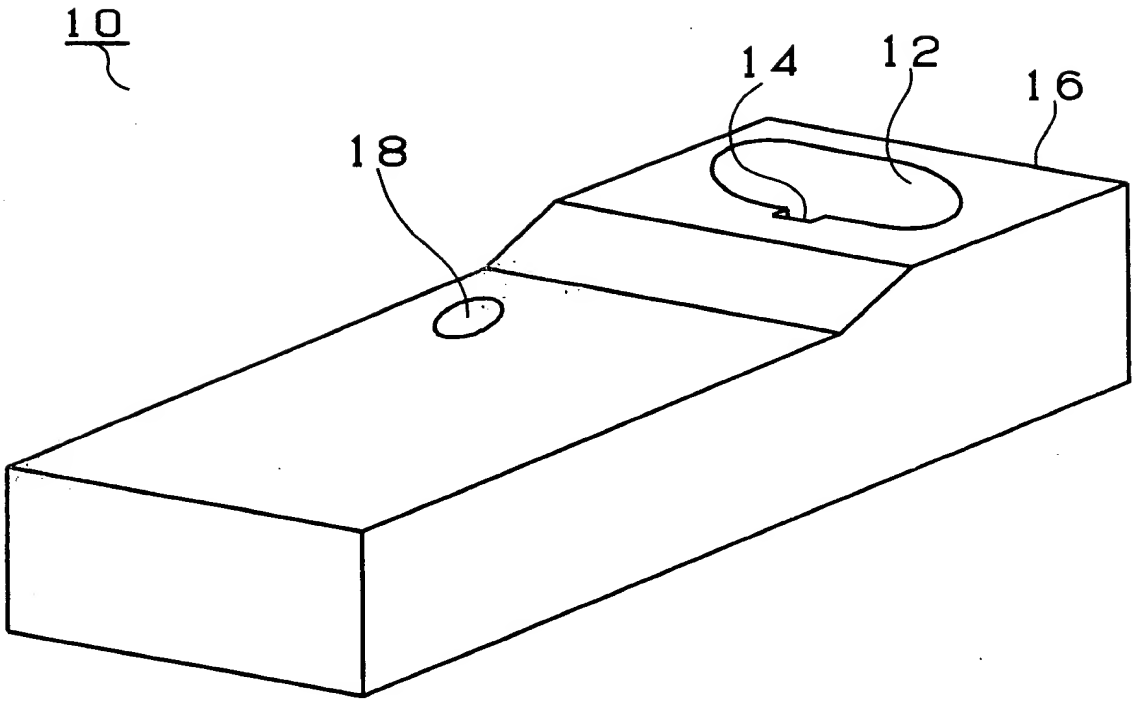
Fig. 1



Applied Imagination

Fig. 2

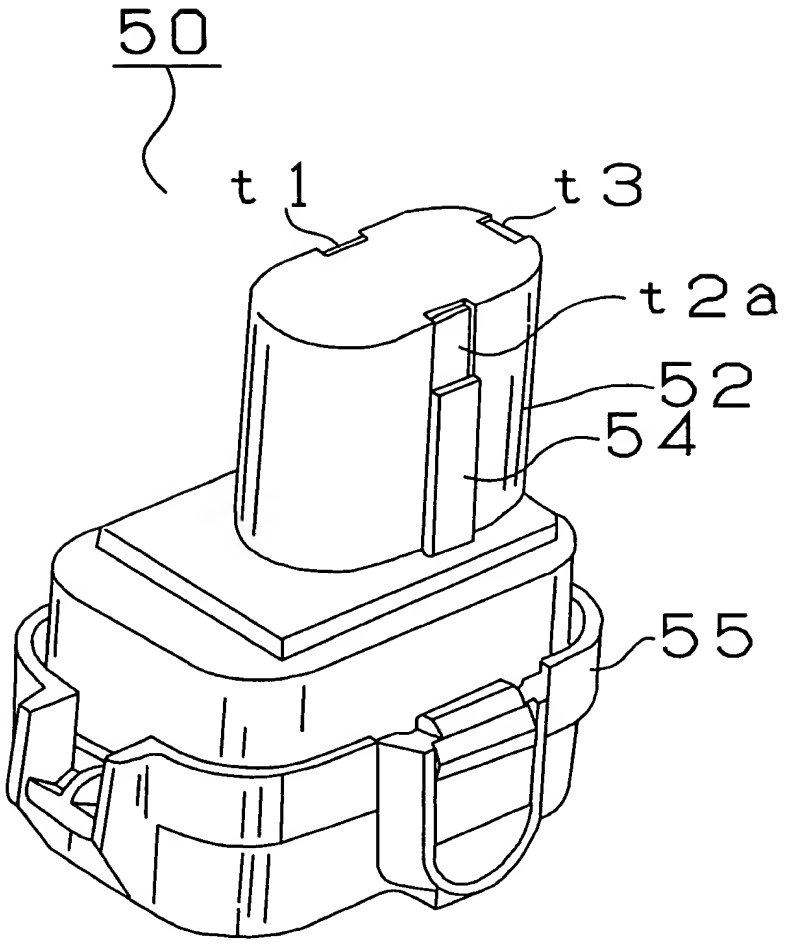


Fig. 3

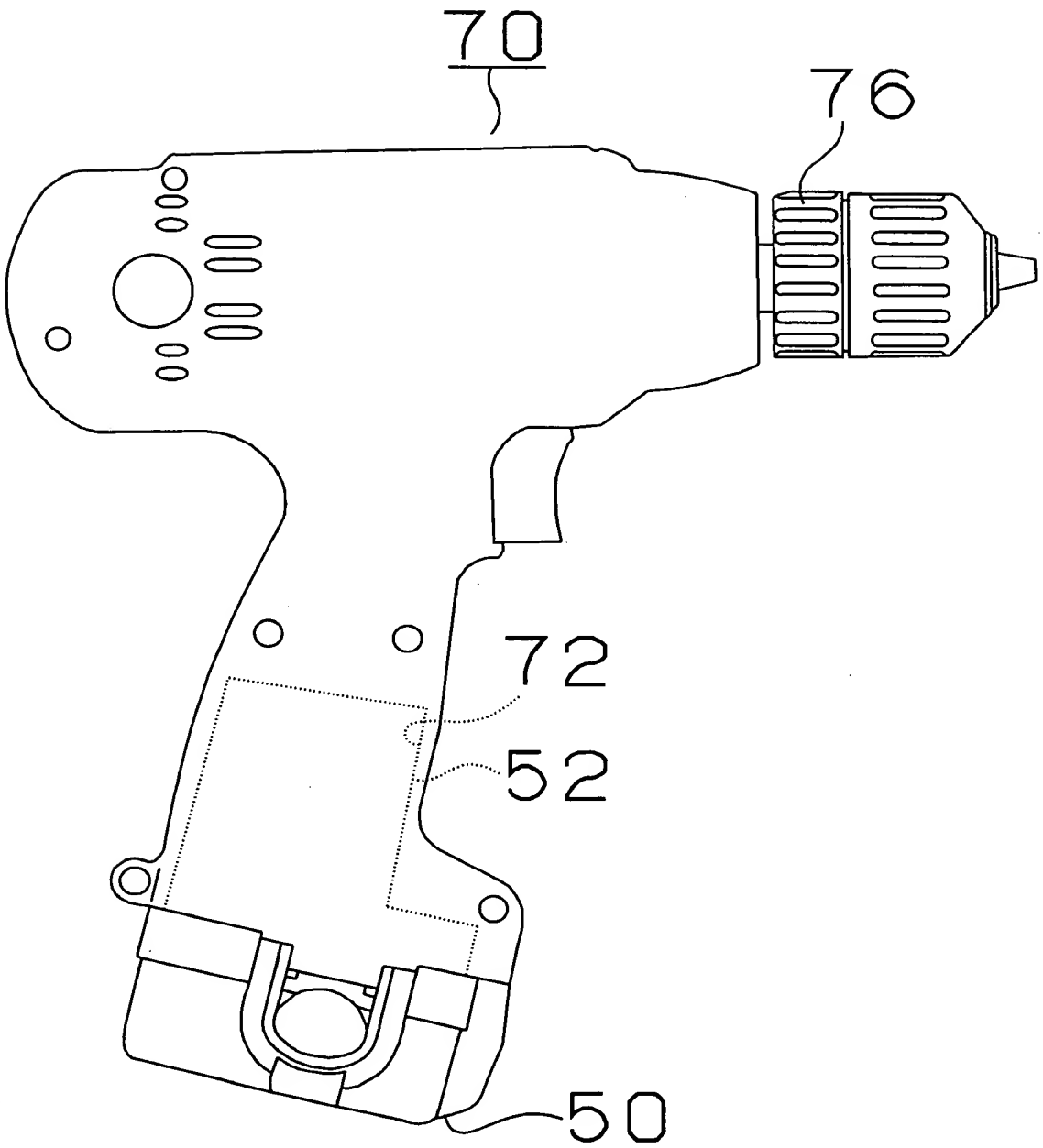
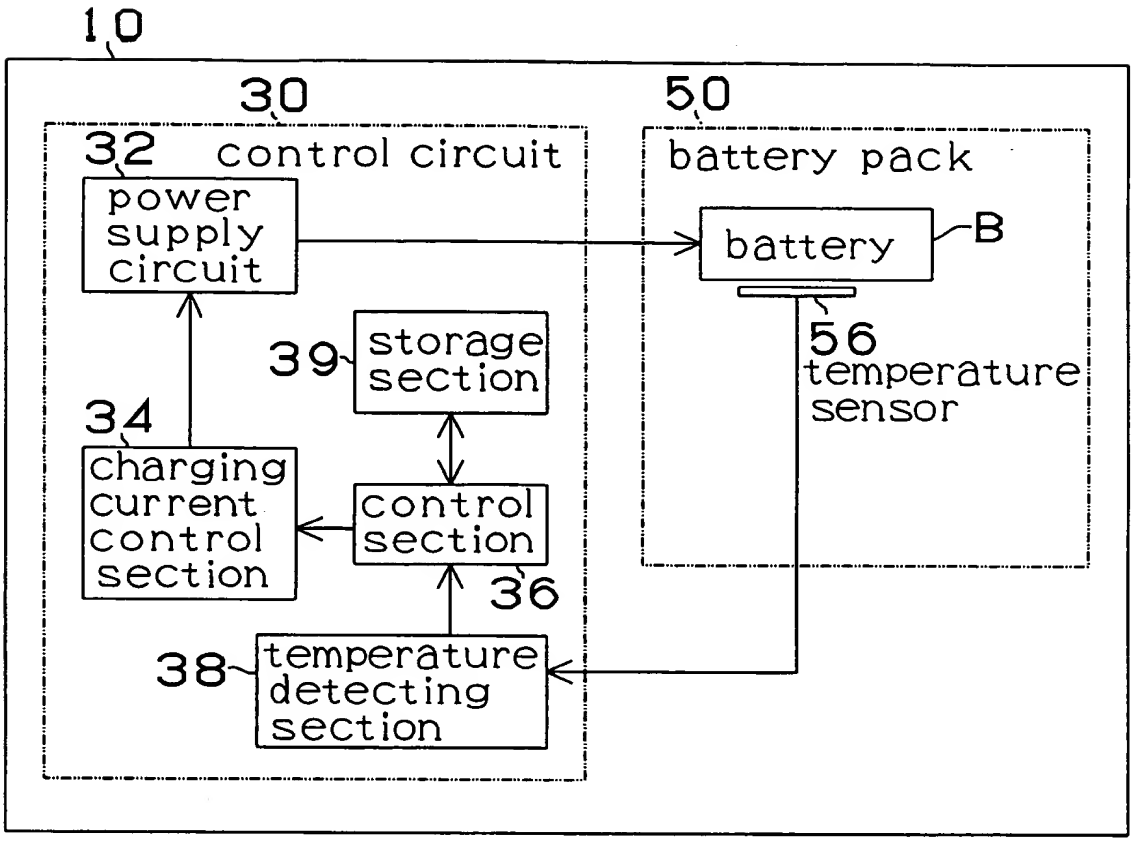


Fig. 4


10
30
32
control circuit
power supply circuit
50
battery pack
battery
B
56
temperature sensor
39
storage section
34
charging current control section
control section
36
38
temperature detecting section

DOCKET T8992560

Fig. 5

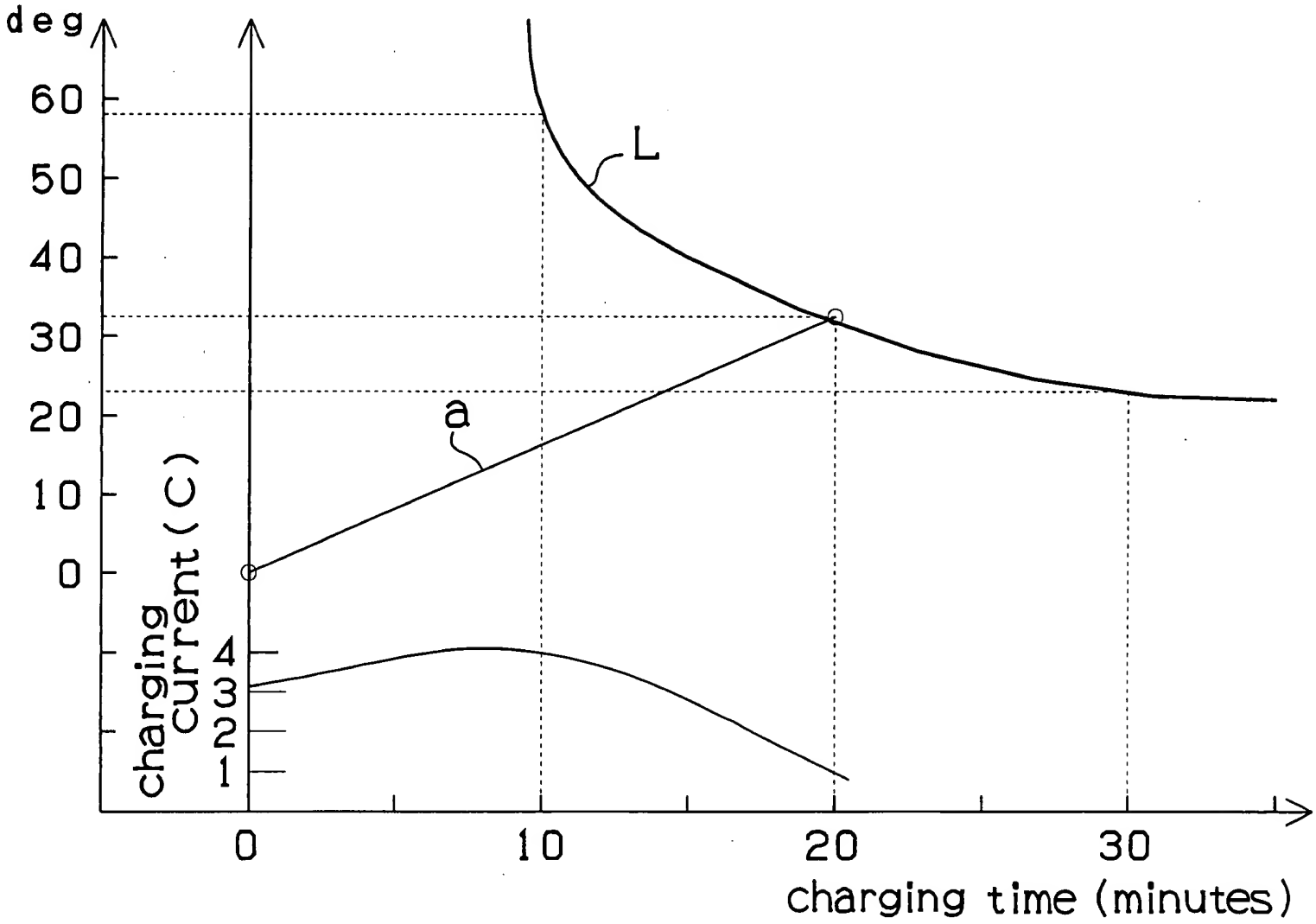


FIG. 6

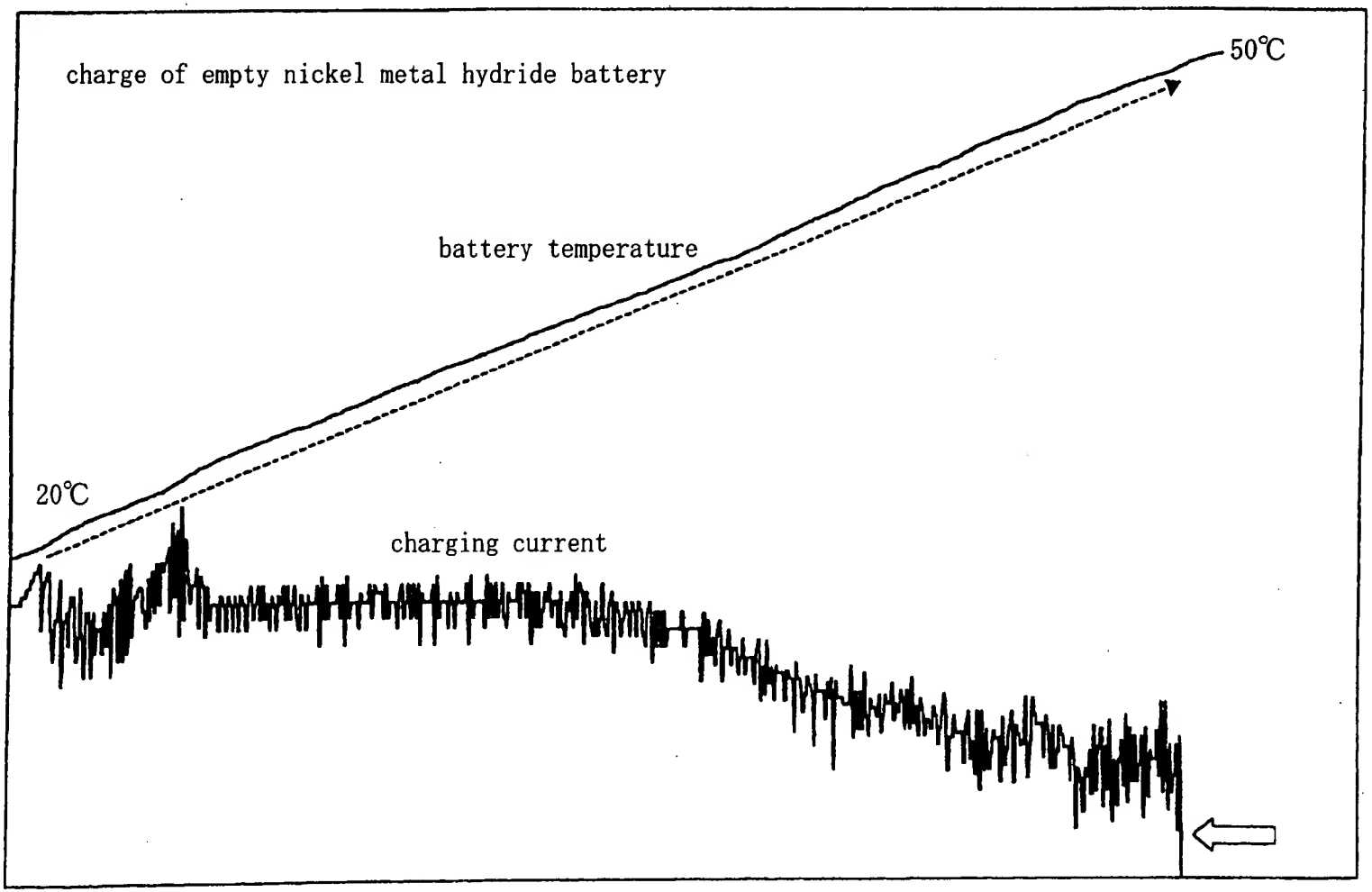

charge of empty nickel metal hydride battery
50℃
battery temperature
20℃
charging current

FIG. 7

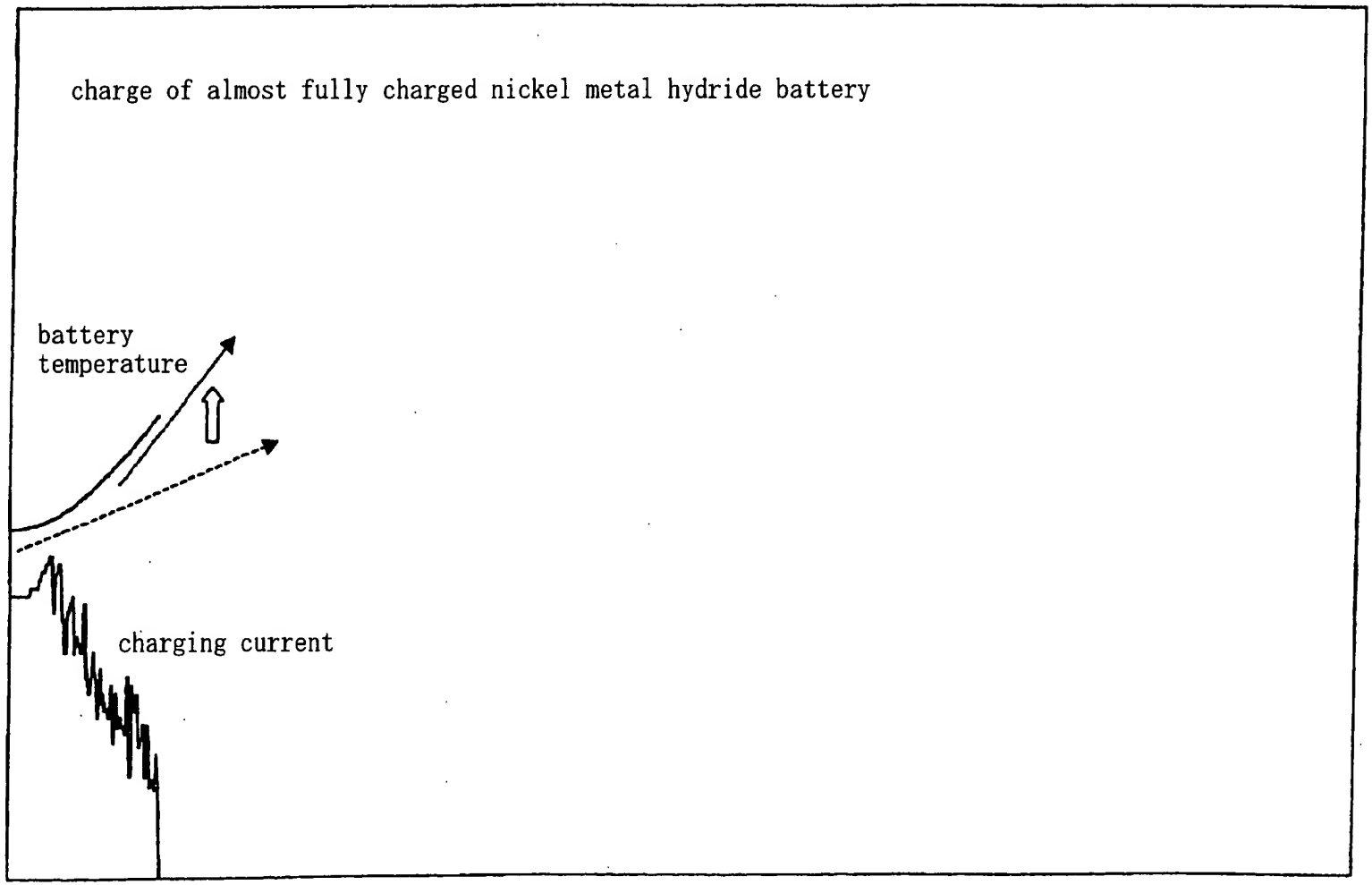

charge of almost fully charged nickel metal hydride battery
battery
temperature
charging current

Fig. 8

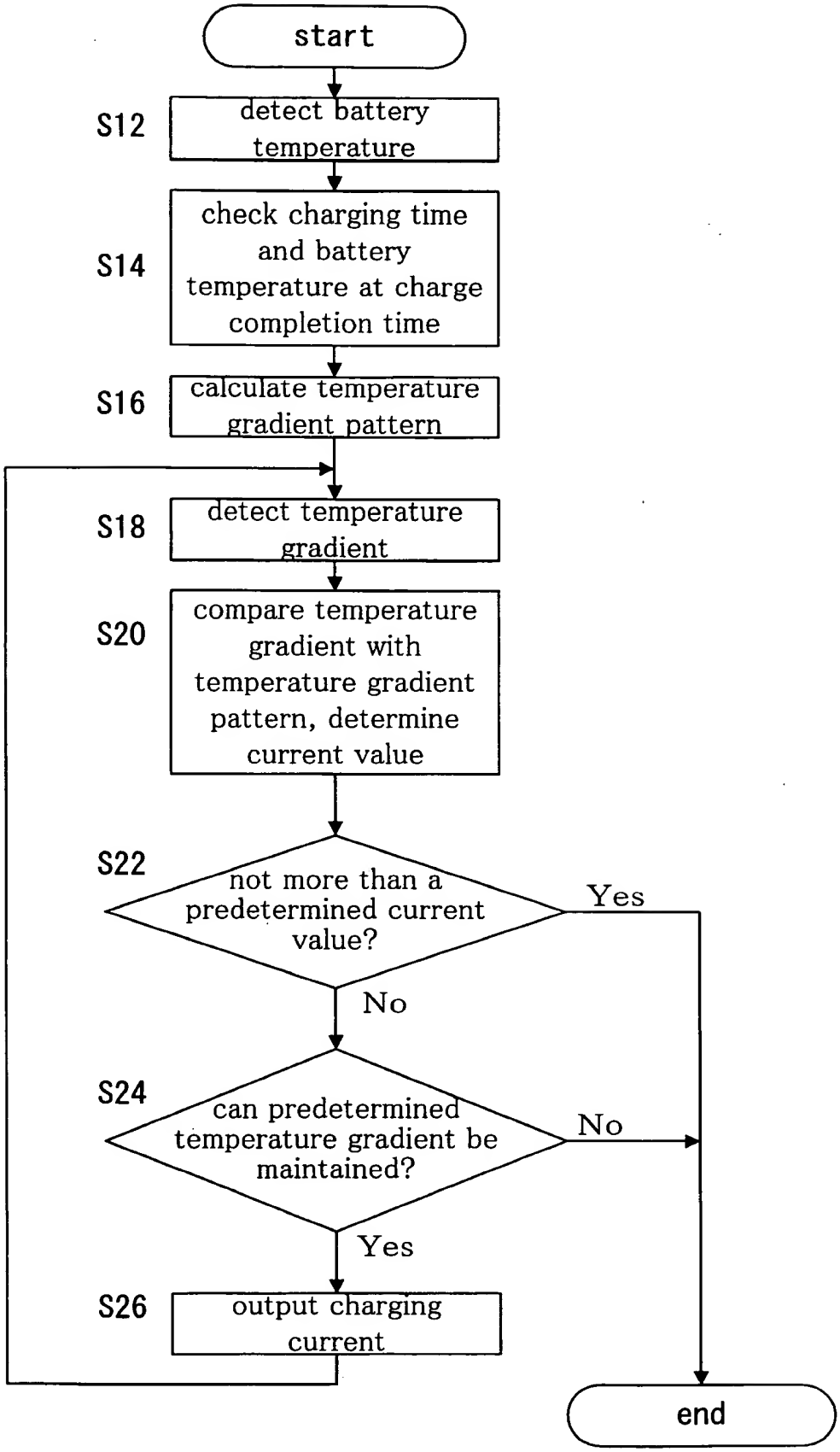
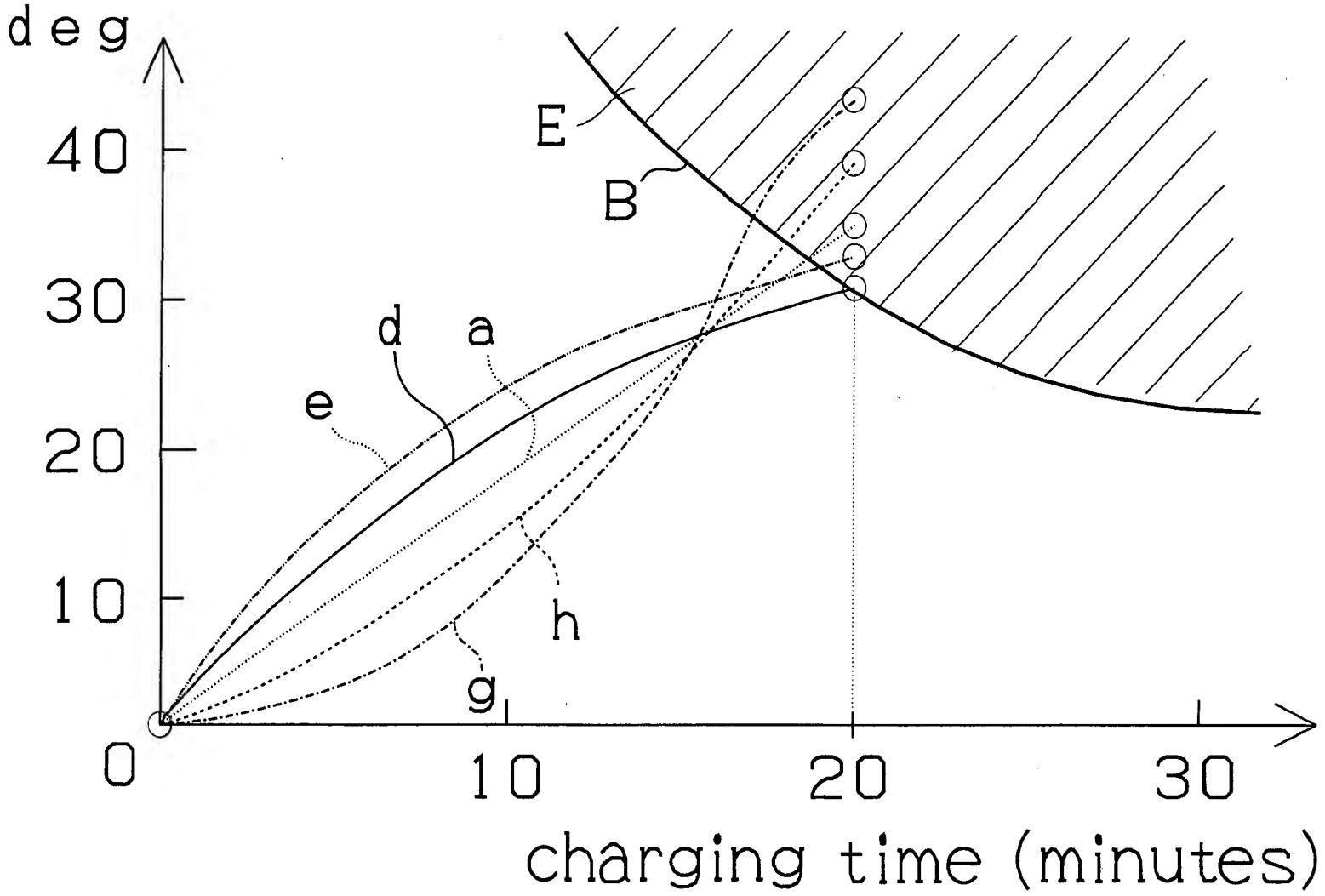

start
S12
detect battery temperature
S14
check charging time and battery temperature at charge completion time
S16
calculate temperature gradient pattern
S18
detect temperature gradient
S20
compare temperature gradient with temperature gradient pattern, determine current value
S22
not more than a predetermined current value?
Yes
No
S24
can predetermined temperature gradient be maintained?
No
Yes
S26
output charging current
end

Fig. 9



0097E0 T8992560

Fig. 10

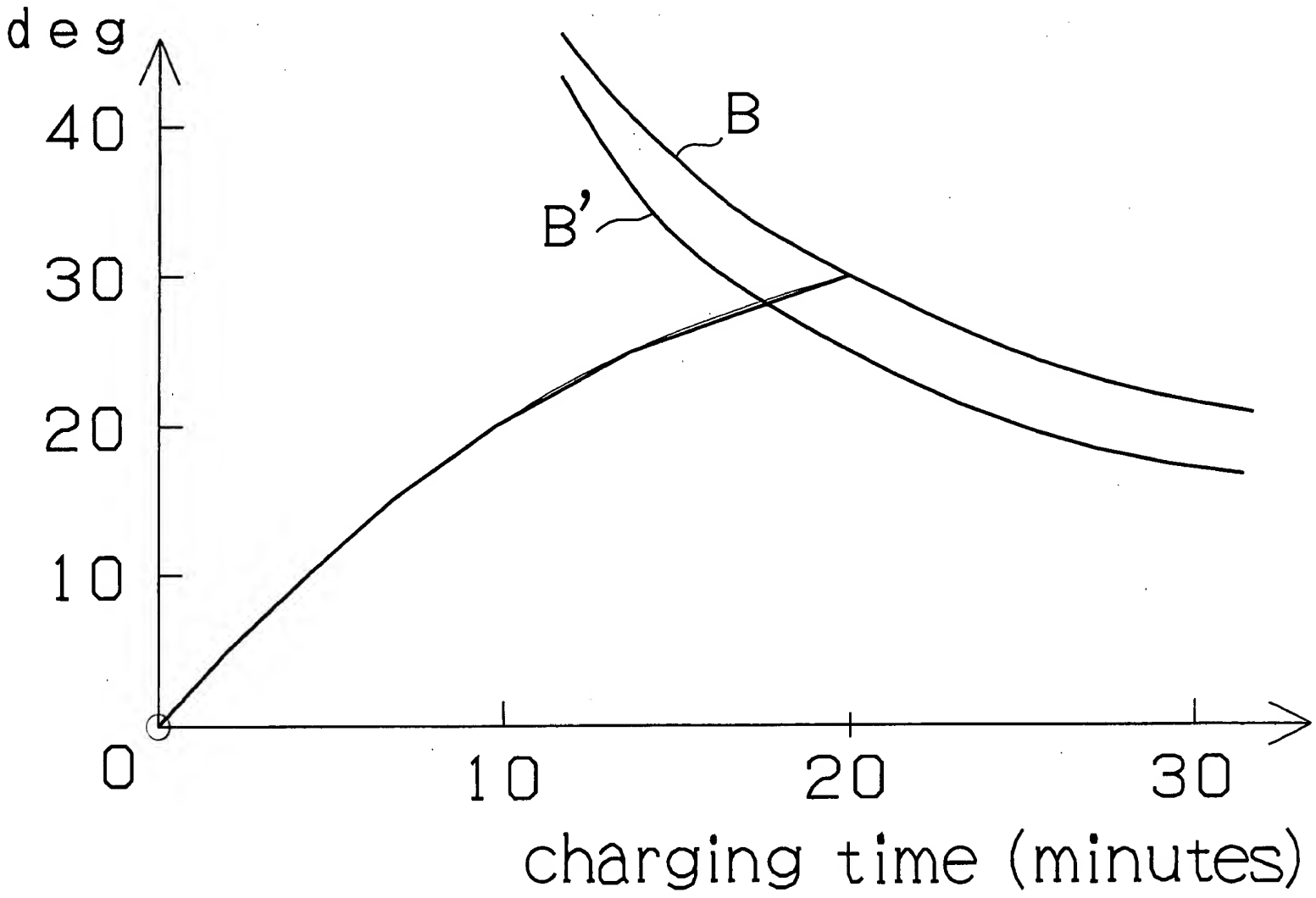


Fig. 11

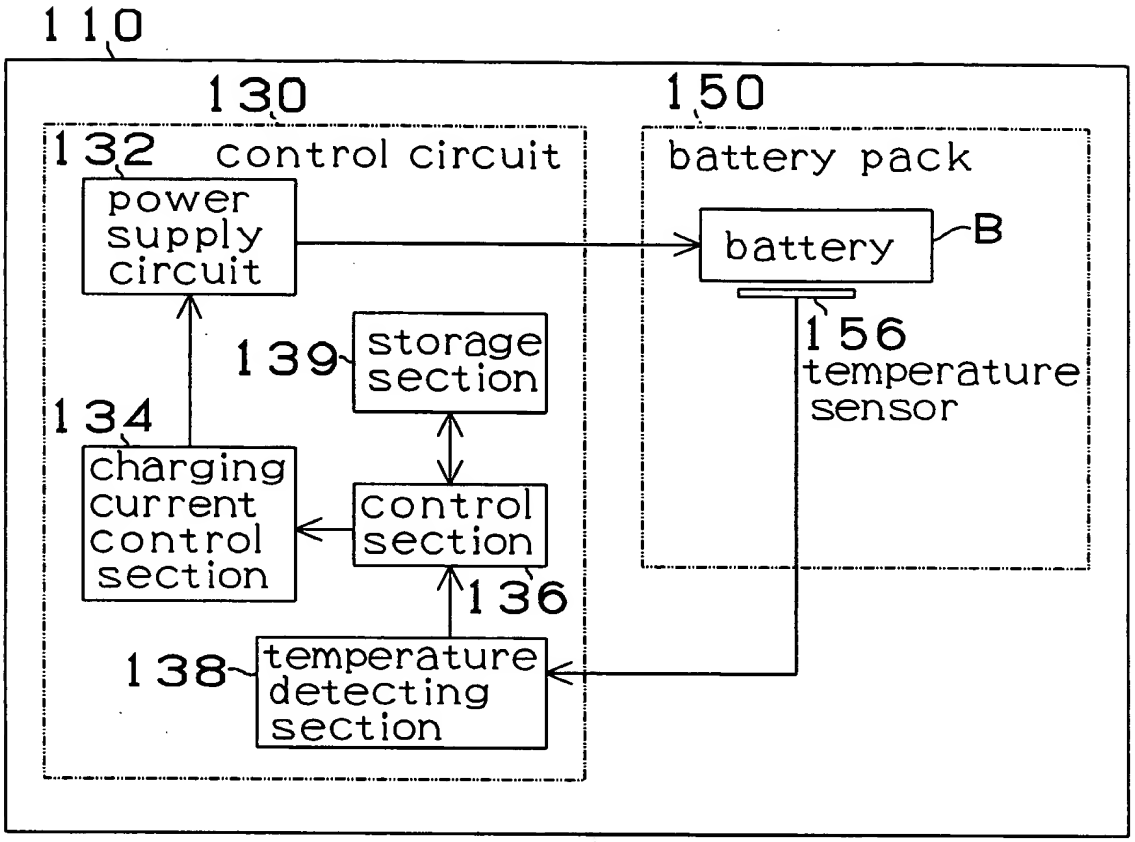

110
130
132 control circuit
power supply circuit
134
charging current control section
139
storage section
control section
136
138
temperature detecting section
150
battery pack
battery
B
156
temperature sensor

Fig. 12

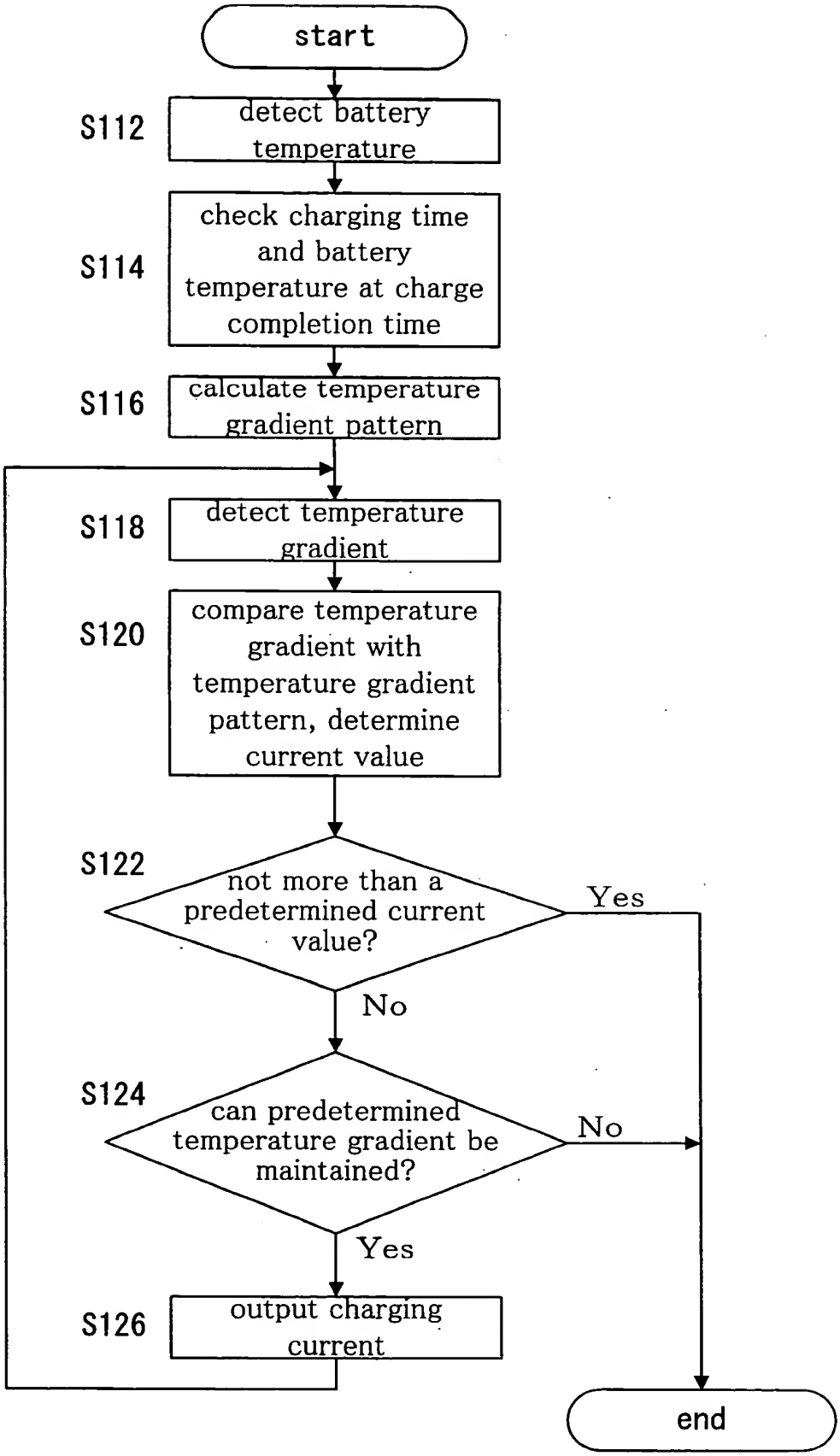
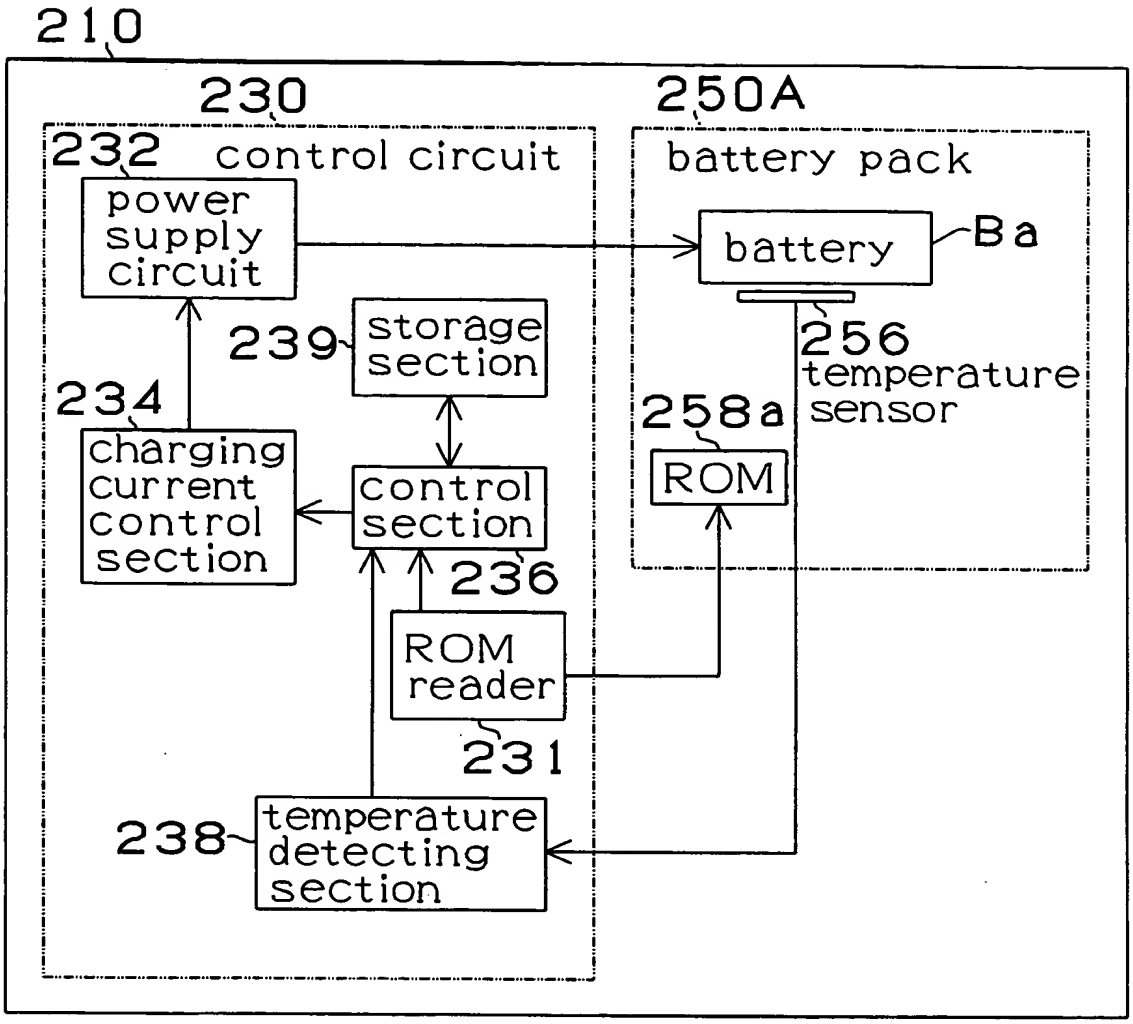

start
S112
detect battery temperature
S114
check charging time and battery temperature at charge completion time
S116
calculate temperature gradient pattern
S118
detect temperature gradient
S120
compare temperature gradient with temperature gradient pattern, determine current value
S122
not more than a predetermined current value?
Yes
No
S124
can predetermined temperature gradient be maintained?
No
Yes
S126
output charging current
end

Fig. 13


210
230
232 control circuit
power supply circuit
239 storage section
234
charging current control section
control section
236
ROM reader
231
238 temperature detecting section
250A
battery pack
battery
Ba
256 temperature sensor
258a
ROM

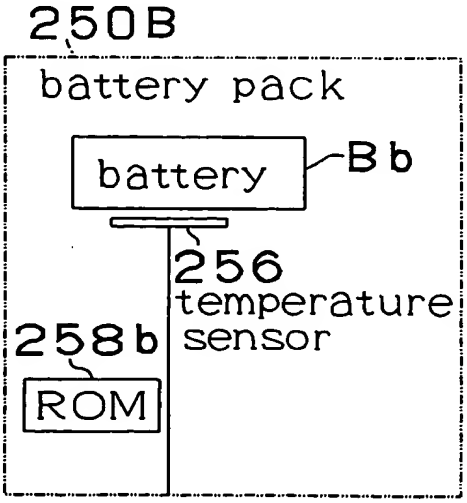
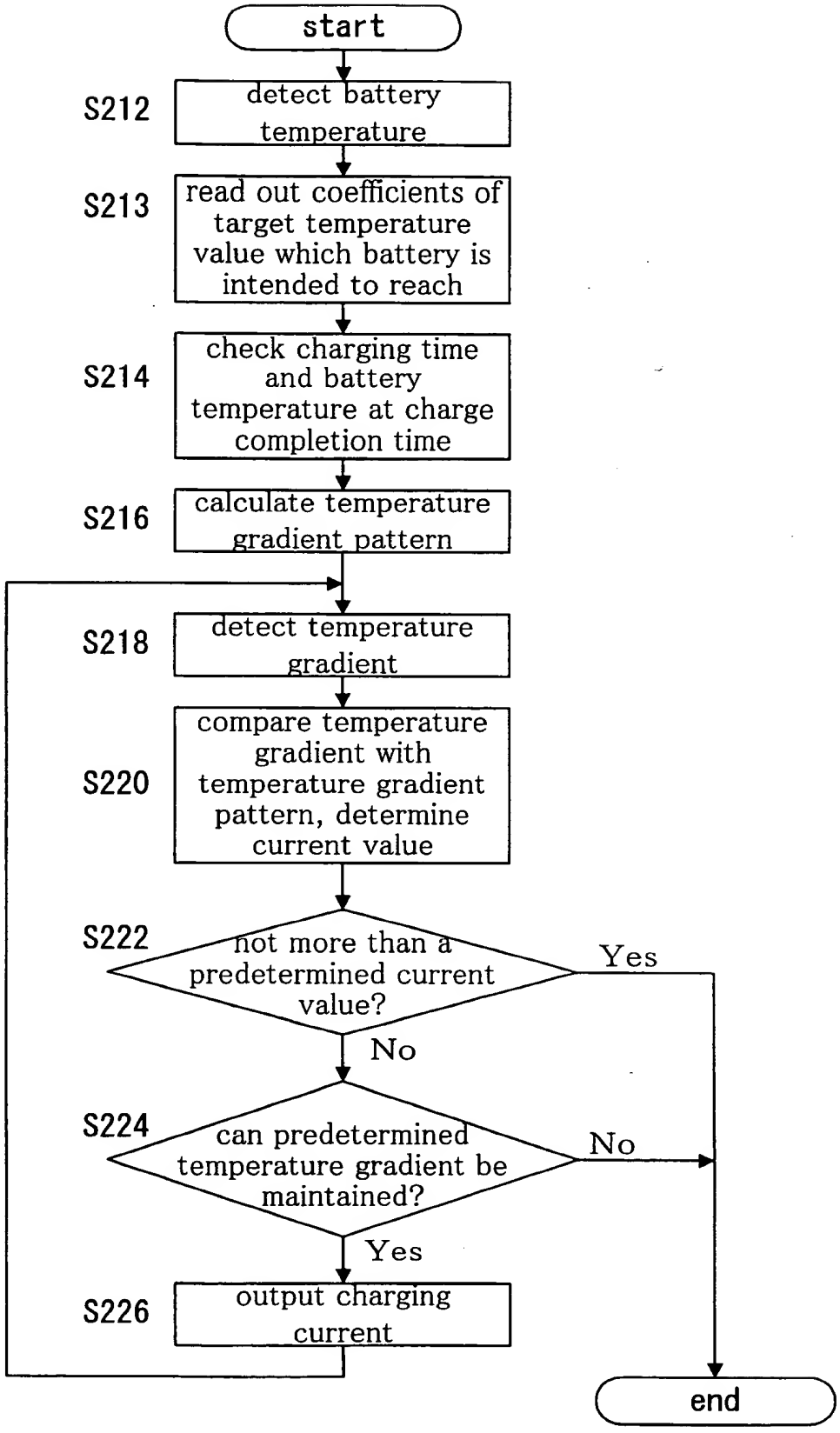

250B
battery pack
battery
Bb
256 temperature sensor
258b
ROM

Fig. 14


start
S212
detect battery temperature
S213
read out coefficients of target temperature value which battery is intended to reach
S214
check charging time and battery temperature at charge completion time
S216
calculate temperature gradient pattern
S218
detect temperature gradient
S220
compare temperature gradient with temperature gradient pattern, determine current value
S222
not more than a predetermined current value?
Yes
No
S224
can predetermined temperature gradient be maintained?
No
Yes
S226
output charging current
end

DUSTED: T8992560

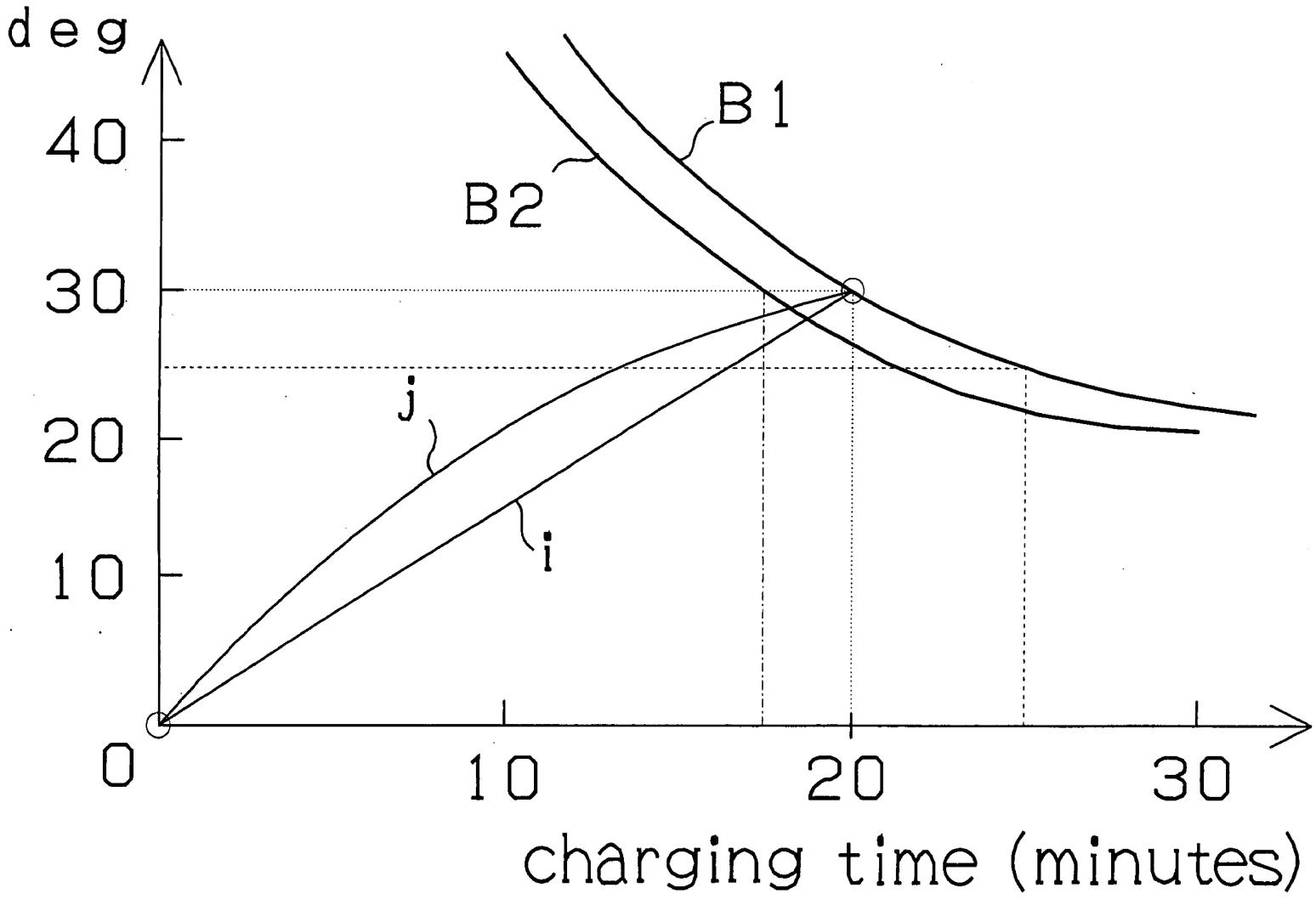



Fig. 15